

Using a Particle Model to • Explain Everything

- What is a "particle model"?
- What is Density?
- What is KMT?

Summary: Particle Model

- Everything is made of particles
- Particles are always moving and colliding
- The amount of matter in a particle is what gives the particle its mass
- The amount of space a particle takes up is called its volume
- Although mass and volume are different, they are related to each other. That relationship is called an object's density.
- The density of an object tells you how the mass in an object is spread out or packed together

All materials are made of particles called "atoms"

- The particles have 7500 basic properties.
- All particles are made of matter (solid?)
- All particles have a volume (size?)
- Very little space.



Are all particles the same size?

What other possibilities exist?



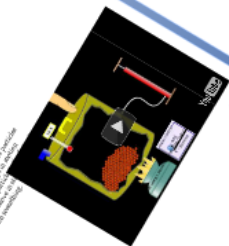
Mass? Volume? Is there an easy way to describe them both at the same time?

Density = Mass/Volume
Density is the mass to volume ratio

An object's density tells you the amount of mass that is packed into a volume.
A small density means that the mass has a small amount of mass in its volume.
A large mass is spread out over an even bigger volume.

Do particles just sit there?

1. All particles are always moving.
2. The particles are always colliding.
3. The particles are always vibrating.
4. The particles are always spreading out.



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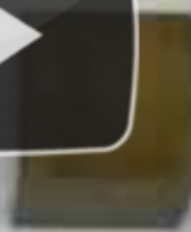
Using a Particle Model to

- **Explain Everything**

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IDENTICAL VOLUMES...



ALUMINUM

89.2g

IRON

244.6g

COPPER

271.3g

LEAD

362.7g

YouTube

MASSSES

All materials are made of particles called "atoms"

The particles have TWO basic properties.

- - All particles are made of matter ("stuff")
Matter is what gives things mass.
- - All particles have a volume ("size") because they take up space.





YouTube

IDENTICAL VOLUMES...



Aluminum
29.2g

Iron
244.6g

Copper
272.3g

Lead
362.7g

DIFFERENT MASSES



THESE PARTICLES
HAVE ONLY A LITTLE
MATTER IN THEM.

THESE PARTICLES
ARE FILLED WITH
A LOT OF MATTER

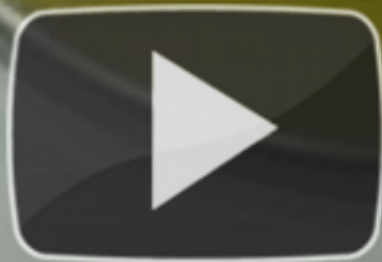
IDENTICAL VOLUMES...



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2.12 g

YouTube



YouTube

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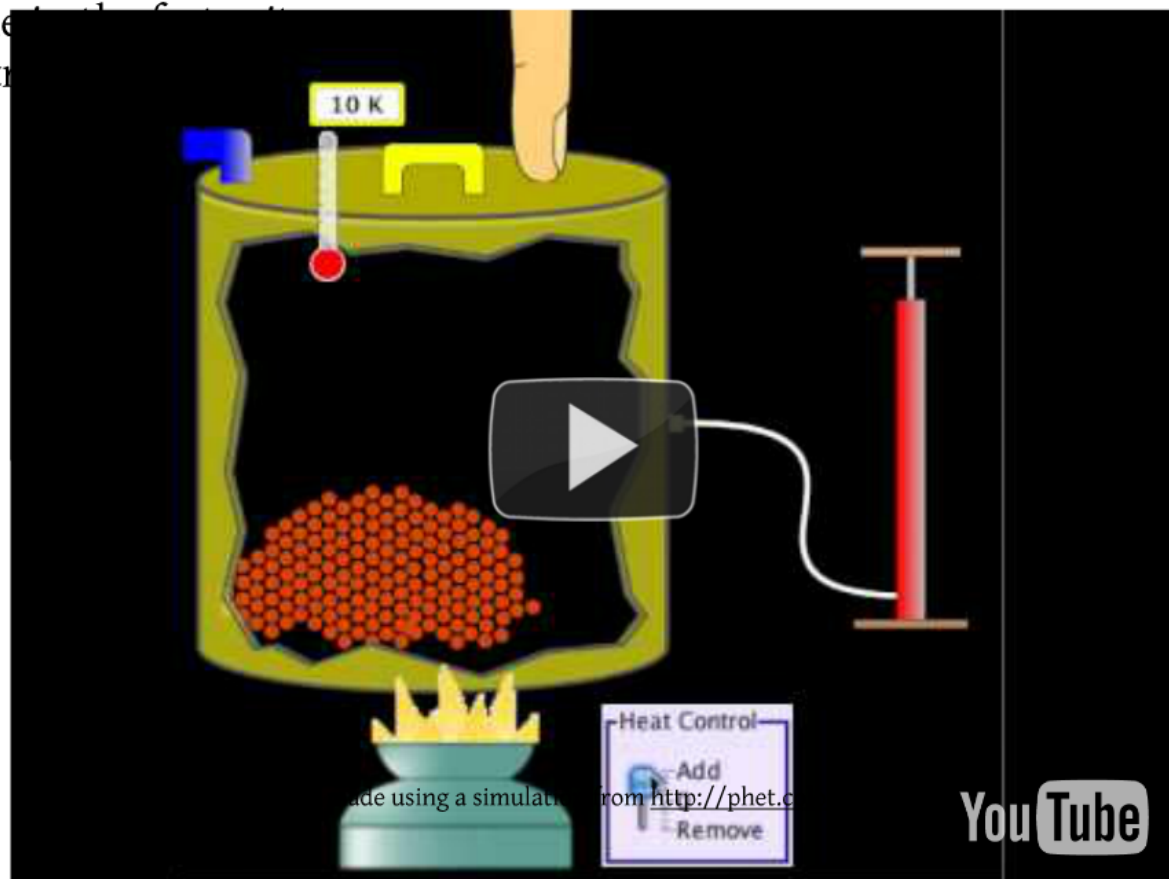
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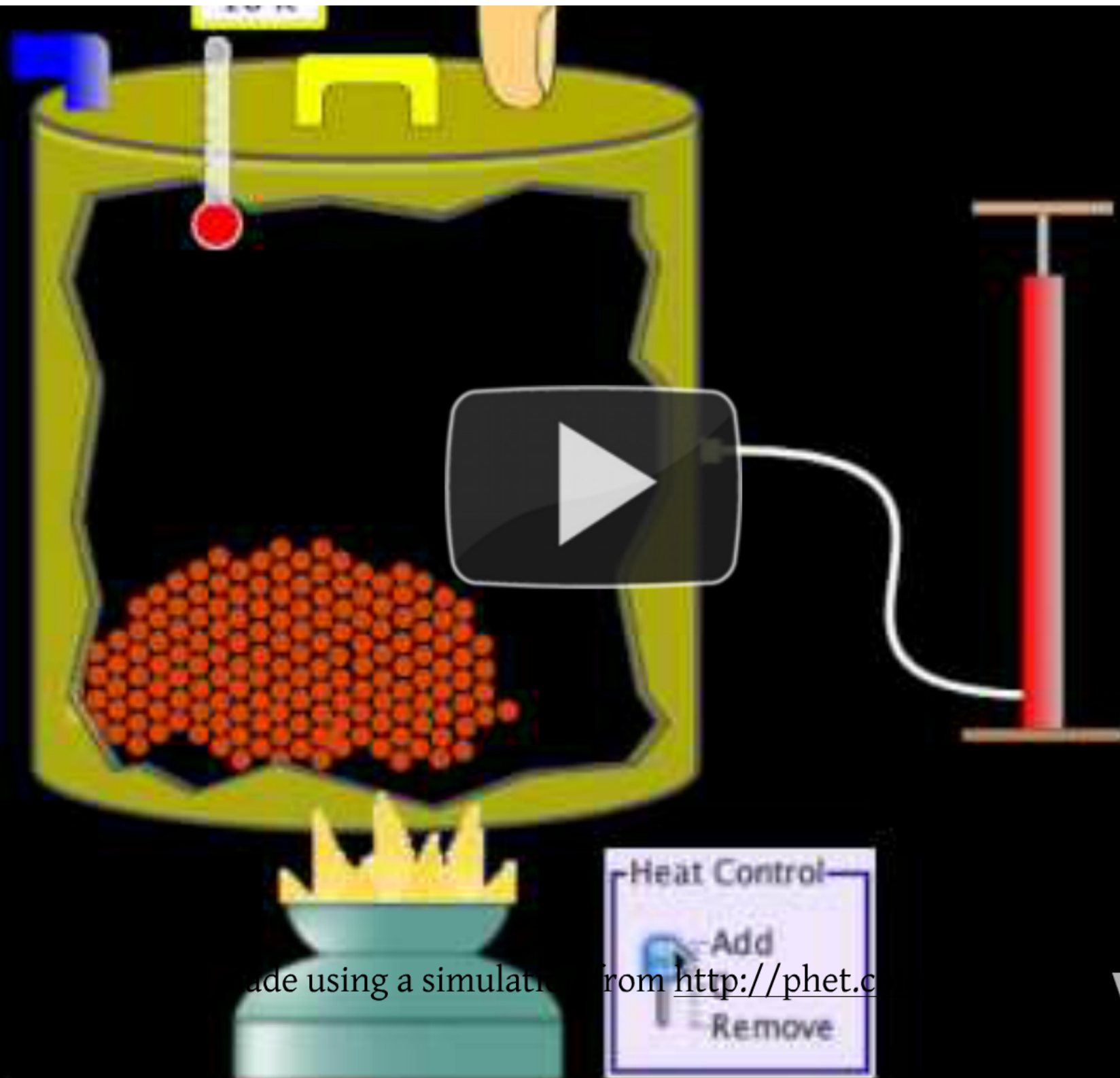
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Kinetic Molecular Theory:

1. All materials are made of particles
2. Particles are always in motion
3. The hotter a particle is, the faster it moves
4. Particles move in straight lines until they collide with something.





made using a simulation from <http://phet.c>

You Tube

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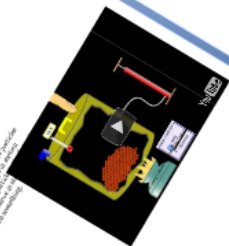
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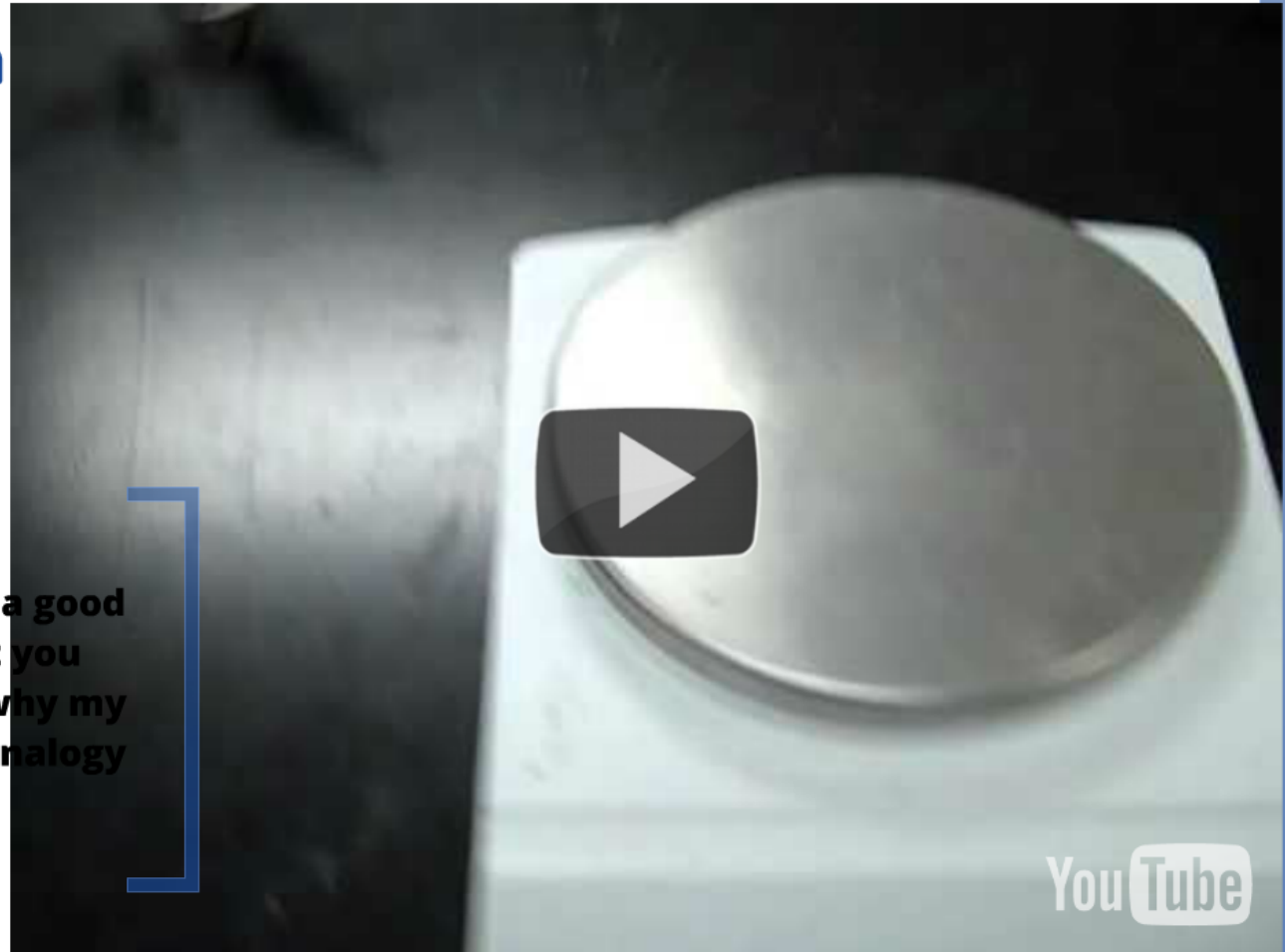
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A parting Question:


In this video I mass an
EMPTY "particle". That
particle has a mass
even though there is no
mass in it!

My use of a cylinder as a particle is a good analogy, but it has flaws. Use what you learned in the video to determine why my "cylinder filled with sand = atom" analogy is not entirely accurate.





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Leave your comments
and answers in the
comment section
below the video

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